

# DOCKETED

IN THE UNITED STATES DISTRICT COURT FOR THE  
SOUTHERN DISTRICT OF NEW YORK

MIDWAY MANUFACTURING COMPANY: Deposition of  
vs. : Ralph Baer  
THE MAGNAVOX COMPANY : Eighth Day  
and : 774C1030  
SANDERS ASSOCIATES, INC. :  
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IN THE UNITED STATES DISTRICT COURT FOR THE  
NORTHERN DISTRICT OF ILLINOIS, EASTERN DIVISION

THE MAGNAVOX COMPANY, et al :  
vs. :  
BALLY MANUFACTURING :  
CORPORATION, et al :  
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IN THE UNITED STATES DISTRICT COURT FOR THE  
NORTHERN DISTRICT OF CALIFORNIA

ATARI, INC. :  
vs. : FILED  
THE MAGNAVOX COMPANY : DISTRICT CLERK  
and : U.S. DISTRICT COURT  
SANDERS ASSOCIATES, INC. :  
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ERNEST W. NOLIN & ASSOCIATES  
General Stenographic Reporters  
369 ELGIN AVE., MANCHESTER, N. H. 03104  
TELEPHONE: 623-6906

Continued deposition taken  
pursuant to subpoena and notice at the Sanders Associates,  
Inc.; Headquarters, Spit Brook Road; Nashua, New  
Hampshire; Tuesday, February 10, 1976; commencing at  
ten o'clock in the forenoon.

transcripts of their PRESENT:

For Midway Manufacturing  
Company, Bally Manufacturing  
Corporation and Empire:

replied that the record of Donald L. Welsh, Esq., 135 South  
LaSalle Street, Chicago,  
Illinois.

corrections and For Atari, Inc.:

Mr. Healy, after Thomas O. Herbert, Esq.,  
160 Sansome Street, 15th Floor,  
San Francisco, California,

counts that For Sanders Associates, Inc.,  
and Magnavox Company:

Mr. Williams, with James T. Williams, Esq.,  
77 West Washington Street,  
Chicago, Illinois.

that Mr. Healy has already indicated in the first  
three volumes that were

For Sanders Associates:

deposition on November  
Louis Etlinger, Esq., and  
Richard I. Seligman, Esq.,  
Daniel Webster Highway, South,  
Nashua, New Hampshire

particular consent to Stenotype Reporter:

then, Ronald J. Hayward

MR. WELSH: Let the record show that this is the resumption of the deposition of Ralph H. Baer which was recessed on January 8, 1976. Mr. Williams, will you stipulate that Mr. Seligman and Mr. Baer may sign the originals of their transcripts of their depositions before any notary?

MR. WILLIAMS: So stipulated.

MR. WELSH: I would like to request that the reporter send the originals which he has thus far here to Sanders for reading, making corrections and signing by Mr. Seligman and Mr. Baer; and, after they have done that, then I request you send the originals to the respective courts that I have mentioned to you. Did you have any comment, Mr. Williams, with respect to any of the corrections that Mr. Baer has already indicated in the first three volumes that were furnished him of his deposition on November 24, 25 and 26?

MR. WILLIAMS: I have no particular comment to make. I have reviewed them.

MR. WELSH: There was another

short transcript, I don't know that you have read that yet, have you, Mr. Baer?

THE WITNESS: The one that pertains to the first afternoon?

MR. WELSH: Yes.

THE WITNESS: No, I haven't seen that. At least I don't remember it.

MR. WELSH: Well, he will send all originals to you.

MR. WILLIAMS: There was one thing; I think on the 24th we got into a problem with whether questions and answers should be under the protective order and it turned out that the questions were separately transcribed and were said to be under the protective order and there is really no need to keep those questions separately, as far as I can tell.

MR. WELSH: I didn't bring those with me. Off the record.

(Discussion off the record.)

MR. WELSH: Well, Mr. Williams called attention to the fact that in the transcript

of Mr. Baer's deposition of November 24, 1975, on pages 17 and 38, two questions were indicated as being separately transcribed on pages designated confidential under protective order. Mr. Williams has just agreed that the confidentiality of these questions may be waived and I request that the reporter retype these two pages inserting the questions where they were without reference to separate transcribing.

MR. WILLIAMS: Just so the record is clear, we are waiving any claim of confidentiality as to the questions. As to the appropriate responses, we aren't waiving any right of confidentiality. The responses were not given.

RALPH H. BAER

called as a witness, having been previously sworn, was further examined and continued his testimony as follows:

(Interrogatories by Mr. Welsh.)

1 Q. Now, Mr. Baer, just before our last recess, we were discussing the demonstration which - or at least the entries in Mr. Harrison's notebook on May 18, 1967, on page 33 of Exhibit 16 and you

indicated that the first contest had been played.

What happened next in the development of the TV games? The contest on page 37 was played, a trophy

A. It is indicated by the next few pages in the notebook; a series of games was developed and played. \*

2 Q. What pages are you referring to?

A. Starting with page 34 and for the moment at least up to 41.

3 Q. Who made the entries on those pages?

A. Mr. Harrison.

4 Q. Did he make all of the entries?

A. All of the entries with the exception of my signature and a few penciled notes on pages 38. That is all, page 38.

5 Q. You say all of those games were played?

A. Yes.

6 Q. And when was that done?

A. Well, let me say that - unless I read this carefully, I can't say whether they all were played.

Q. Taking them one by one, the pumping game on page 34 was built as part of a demonstration which we already inspected last time we were here. On page 35, the firefighters pumping game was also built. I

Q. think you recall my showing you overlays that were  
 A. used in conjunction with that game. The color  
 catching contest on page 36 was played, although  
 not quite the way it is shown here. The game  
 described on the right-hand side on page 36 was  
 played and there is an overlay corresponding to  
 it in our collection of overlays on the table here.

7 Q. What game was that?

A. The game which uses the TV screen as a bar graph.  
 It is a game that involves matching colors that  
 actually appear on the screen to predetermined  
 guesses as to which color is going to show up.

8 Q. Now, none of these games which you just described  
 include any generation of a dot image, do they?

11 A. No, they all include the generation of a partially  
 unblanked screen with the separation between the  
 unblanking and the blanking or the changing color  
 being variable. The function of some delayed  
 multivibrator's adjustment.

9 Q. That is the color of the entire screen for only  
 an unblanked portion?

12 A. The color changes at the instant the multivibrator  
 changes state.



10 Q. Is that the color of the entire screen?

A. Yes, the color of the entire screen, that is correct. It might go from blue to white, but more likely it would go from blue to red or some other color. I don't recall exactly what. In the pumping game, for example, the bottom half of the screen up to the line determined by the delay multivibrator was blue and as you pumped, the delay multivibrator had a shorter and shorter period and, therefore, the blue area effectively rose on the screen, and above it which was blanked was dark. The game on page 37 which is called roulette on the page, I don't recall whether we played that in this form or in any other form.

11 Q. It did not involve the generation of an image, did it?

A. No, again simply the change of color of the entire screen or part of the screen. The game on page 38 which was called Fifth Game Car Ride or (Race) was built, although I cannot say whether it was still at that moment.

12 Q. Were these just suggested games that were subsequently built at some time or were they built at the time



- Q. that the entries are indicated? described here.
- A. No. I think we will find as we go through the book that that question is answered. Those things that were actually built will be represented by schematics that were used to implement the concepts. So the answer is that at the point of entry into the book, they were ideas to be followed up; and whether they were followed up, we are going to have to learn from going through the succeeding pages.
- Q. I just don't remember. In fact, if you go on to
- A. page 39, here is a detailed schematic done by Harrison of the delay multivibrator that is used to move the spot on the screen that denotes the car from side to side, from left to right. He goes through the calculations, the values and he shows how you use the Hewlett-Packard audio-oscillator to produce the controlling voltage that positioned the car laterally on the screen. So that was which certainly played on this day and on succeeding days; plus page 40 goes on to describe both the pumping game and the car race and then again on page 41 the car race is continued with some more circuitry shown.

Q. Were any games of these that are described here built, but not played?

A. It is possible. I'd like to invite your attention to the note on the middle of page 41, it says the circuit has been tested and performed as intended, which is a reference to the car race game. It comes back to me how we made this into a two-player game in which one man drives the car and the other guy tries to throw him off the road.

Q. Would you explain how that works?

A. Yes, we had the opposing player manipulate a control shown on page 41 as a 2500 ohm potentiometer which affected the horizontal delay multivibrator.

Q. First of all, could you describe what players saw on the screen?

A. The players saw a spot moving from side to side. Let me start again, Mr. Welsh. The players saw a symbol on the screen which represented the car which was to be manipulated by one of the players in terms of its horizontal position on the screen; in other words, the driver.

Q. What was the shape of that symbol?

A. A rectangle elongated in a vertical direction. The

top view of it would be of a simulated vehicle. Secondly, the players saw an unblanked, I assume, white band - that can't be right, it has got to be black. Anyhow, a band surrounding the car which denotes the roadway and it is not clear right now to me whether that was blanked or whether it had color. I am pretty sure it was blanked, so the roadway must have appeared as black. Opposite of the sketch on the bottom of page 39 and the sides of that roadway undulated as a function of that audio-oscillator on the bottom of the page 39 in the initial experiment and later on as a function of the control on page 41 which was manipulated by the opponent as shown in the upper left-hand corner of page 41. So to summarize it, he saw a symbol of a vehicle superimposed on a road delineated by a blanked area flanked left and right by apparently colored areas. The picture on page 39 says that the area was green. That is, the roadway running through grass in effect, through a field grass, with a car manipulated by one driver and the edge of the roadway manipulated by the other driver. The object of the game being to keep the car from touching

the edge of the roadway which would be sensed as coincidence and, of course, caused to do something, I don't remember just what.

13 Q. How was it sensed to be coincidence?

A. When any part of the real time signals representing the car symbol were coincident in real time with the transition from roadway to grass or grass to roadway.

14 Q. Was that just sensed visually by the players?

A. No, it is done in logic.

15 Q. And what happened when that occurred?

A. Well, as I just said, I don't remember. I don't remember whether we wiped out the car or whether we changed colors. Perhaps it will come out of reading the next few pages.

16 Q. You don't recall?

A. I don't recall at the moment. There is a clue to it on page 41. At the bottom it shows a timing circuit which is intended to change color after a predetermined time. That is strictly a timer. That was used with our fire-fighting game later on.

17 Q. Can you find the logic which you saw sensed the

coincidence of the image of the car with the apparent edge of the roadway?

A. As a matter of fact, I have been trying to do that, Mr. Welsh. Now I can't find that. It is not in the next few pages.

18 Q. Was it possible that that was not done then at that time?

A. Yes, it appears that way.

19 Q. If there were no sensing of coincidence at this time; that is, the time of the dates of these notebook entries in May of 1967, what did happen with respect to this car ride or race game?

A. Well, I can only assume now, Mr. Welsh, that the coincidence had to be visually detected, nothing happened as far as the hardware was concerned. The car simply overlapped the edge of the roadway.

20 Q. But you don't have any specific recollection of that?

A. No, I don't since we did it otherwise somewhere downstream.

21 Q. Do you know whether the edges of the roadway actually undulated as of this time in May?

A. Yes, they did because we just went past that here in connection with the application of the

Hewlett-Packard oscillator. There are specific notes on page 39 at the bottom of the page which refer to this undulation. It says here that with the oscillator frequency, meaning the Hewlett-Packard oscillator, just above or below 120 cycles - well, the word edges is missing, but that is what is meant. Moves around speedily up and down. Then comes the thought, random amplitude change of oscillator signal would give more interesting effects. What he meant by that was that the sinusoidal variation of the Hewlett-Packard oscillator gave a certain pattern which he obviously recognized. Like "S" curves on a road, and a random signal would give him a more interesting effect.

22

Q. Do you know whether this was actually done? That is, the adjustment of the frequency of the oscillator, or was this just an idea that Mr. Harrison was going to try?

A. I can only say that since the detailed schematic is here, it must have been done just that way and the bottom note about going to a random generator was a result of observing the repetitive nature of the display which we disliked. Well, here again on

page 40 on the bottom half of the page, Game No. 5, car ride, Harrison's words to the effect that the game had been played and details of what it looked like and some suggestions that I made to make a more competitive game which resulted in the change from this Hewlette-Packard oscillator to a manually controlled pot and that is described on the top page 41, to make it a two-player game and certainly we played those things.

23

Q. And, as of this time, there was no sensing of coincidence other than visually by the players?

A. It doesn't appear that way. There is an overall schematic on the next page which we hadn't come to, page 42, which shows the elements of a block diagram that I suggested be built for the purpose of putting two spots up on the screen and that doesn't show any coincidence. On the following page, page 43, is a detailed schematic of that block diagram.

24

Q. Was that built? Was that circuitry built at that time, May 23, the date of the entry on page 43?

A. Yes, because on page 44 he talks about changes he had to make to those circuits because of problems



encountered and he details those changes in the top third of the page.

25 Q. Now, up to this time, that is May 23, 1967, it appears that there was generation only of the single image or dot, is that correct?

MR. WILLIAMS: Well, I object to the question. He has testified at length over many days as to what happened prior to that date and I don't think you can expect him to remember just what all the testimony has been and what is contained in all the documents that bear dates or reflect activity prior to that date which you refer to. And, further, the record will speak for itself as to what that testimony is.

THE WITNESS: Mr. Welsh, may I point out that the notebook which we have been going through only summarizes the bench activity which Harrison undertook at the time. I am speaking about Exhibit 16, and that Exhibit 23 which is the folder of looseleaf lab notes bearing the same general dates has considerably more detail of just what Harrison did on a day-by-day basis than the summaries contained in Exhibit 16. And that if we

are going to continue to go blow by blow here, we ought to go back and forth between those two references.

Q. Do those other documents indicate any further than Exhibit 16 whether the car ride game was constructed; and, if so, of what it consisted of?

A. They do not, Mr. Welsh.

Q. Do you recall who first had the idea for having more than one movable image?

A. Mr. Welsh, we went through that in connection with Exhibit 16-4A dated 6 September, '66, which is a block diagram in my handwriting showing the overall system for moving two spots on the screen of the TV set.

Q. And we concluded, did we not, that that system was not operative?

MR. WILLIAMS: I object, the record speaks for itself as to what is concluded and what it meant. If that conclusion was made on the record, the record will show that that conclusion was made.

Q. Do you recall?

A. Not specifically. We did quite a bit of ruminating

on the subject when we went through it and I would prefer that you read my earlier testimony before we go through it again.

Q. Referring to page 4A of Exhibit 16, is there not a single and-gate with the arrow and the legend chroma gates to receive the outputs of the four multivibrators in that schematic?

A. Yes, Mr. Welsh. I think I recall telling you previously that that probably should have been an or gate symbol and not an and gate. It is simply a summer. There are some other gates which may not show on your copy in dashed lines.

Q. So at least as shown, this is not operable to generate two dots that are movable?

A. Well, the intent is clear enough.

Q. But that circuit is not operable for the intended purpose?

A. I'd say it is as operable as any circuit in a blocked diagram which an engineer starts out with and he finds out in the course of bench activity he has <sup>made</sup> a mistake and he makes the correction.

Q. But, as shown, it is not operable?

A. You are the lawyer.

34 Q. Would you answer the question?

A. I say it is.

35 Q. As shown?

A. Unless the symbol that appears to be a four input and gate is recognized to be a summer, which it is obviously intended to be, separate symbols won't show up on the screen.

6 Q. Referring to page 42 of Exhibit 16, could you read the entry just below the line near the top?

A. Yes, "At this time it has been requested by R. Baer to build additional horizontal and vertical delay multivibrators to enable two operators via individual sets of controls to move about the CRT screen two independent color squares or rectangles which are variable in size."

Q. Do you recall making that request?

A. Nine years later, no, sir.

Q. Can you tell from that entry when this was done, if it was done?

MR. WILLIAMS: If what was done? I object to the question as vague.

Q. Well, there was a request, apparently, according to the entry by you, Mr. Baer, for Mr. Harrison to

build additional horizontal and vertical delay multivibrators; was that request responded to by Mr. Harrison?

A. Yes, I thought we had gone through that too in connection with the entry on page 44, unless I am mistaken, that it talks about having built the equipment and encountered problems which he solved by making changes as shown in the top third and top half of page 44.

Q. Was such equipment built prior to May 23, 1967, the date of the entry on page 42 of Exhibit 16?

A. I don't think so. Well, let me amend that, Mr. Welsh, let me understand the question. This is not the first equipment that was built to move spots about. We went through that several weeks ago in connection with the utilization of a Heathkit generator and the vacuum tube breadboard which was used to generate a spot.

Q. That was a single spot, though?

A. A single spot, that is correct. If your question is if this is the first time that dual spot equipment was built - - -

Q. Yes.

A. Yes, one would have to conclude from this here that the answer is yes.

Q. Did that equipment described on pages 42, 43 and 44 include any means for detecting coincidence?

A. No.

Q. Was such a means subsequently added to the equipment for generating two dot images?

A. Yes.

Q. And whose idea was that?

A. I don't recall. We will have to wait until we get to it.

Q. I direct your attention to page 45 - or going back a little further, to the lower third of page 44 - - -

A. You found the first appearance of the coincidence circuit.

Q. Now, Mr. Harrison made that entry, did he not, on page 44?

A. Yes, he did.

Q. Could you read the entry?

A. "Have a phenomenon occur when the two characters are coincident. Example, the constant carrier color signal alone creates a solid color on the CRT. The color is dependent on the color phase

shifter circuit - - -"

Q. May I correct you, I believe it is the color is dependent on the setting of the color phase shifter.

A. I am sorry, "To the setting of the color phase shifter circuit. It will be set for blue. Now, when two noncoincident monochrome signals are added, the effect is two brighter blue characters displayed on the CRT. However, when these two signals are made coincident, the color changes to something towards yellow-red."

Q. Is there a question mark at the end of the entry you just read?

A. Yes.

Q. Do you know who put that question mark there?

A. No, I do not. The whole paragraph has nothing to do with the coincidence detection, it simply has to do with color circuit phenomena and changes in colors and what you are after is on the bottom of the next page, page 45.

Q. Before we leave the bottom of page 44, that entry was made by Mr. Harrison, was it not?

A. Yes.



Q. Did he make any other entries in his other notes that he kept while he was working on this?

A. It appears that the note we have just read on page 44 of Exhibit 16 was copied by Mr. Harrison from his own looseleaf notes, the same date, Exhibit 23, Item 34; but there is no additional material on the looseleaf page.

Q. I believe the looseleaf page, Exhibit 23-34, is dated May 23, 1967?

A. That is correct.

Q. And page 44 of Exhibit 16 is dated May 24, is that correct?

A. Yes, but the looseleaf page really is copied over as page 42 on the same date in part and the note which I read shows up on page 44, so <sup>where</sup> ~~it~~ is not a one for one correspondence between the pages. Back to your question of whether there is additional data here, there isn't any.

Q. Now, do you know whether the idea expressed there on the bottom of page 44 was that of Mr. Harrison's?

A. I can't possibly recall that.

Q. You don't recall whether it was yours or not?

A. No.

58 Q. Could we see the original of page 23-34?

A. Certainly.

59 Q. Now, that entry at the bottom of page 44 of Exhibit 16 does contemplate something occurring when the characters are coincident, does it not?

A. No.

60 Q. Of a phenomena occurring when the two characters are coincident?

A. At this point, it doesn't. I think he just reports on the phenomena that occurred unintentionally.

1 Q. In other words, this describes something that happened when he built the circuit?

A. Something that happened when he tried it, that is right.

Q. Referring to Exhibit 23-34, could you read the entry just below the blockdiagram?

A. "This additional circuitry has been built and tested. Works pretty well."

Q. And then the rest of it before the example.

A. "Have a phenomena occur when the two squares or monochrome signals are coincident and a constant carrier color signal is summed in." And then follows thereference which we already read into

the record.

Q. Well, it is similar to the other one?

A. Yes, very close to it.

Q. Could you read that in, too, it is not clear from my copy.

A. "Example: the constant carrier color signal alone creates a solid color on the CRT. The color depends on the setting of the color phase shifter. It will be set for blue. Now, when two known coincident monochrome signals are added, the effect is two brighter blue squares displayed on the CRT. However, when these two monochrome signals are made coincident, the color changes to something towards yellow."

Q. Do you remember observing that phenomenon as he described it on or about that day?

A. I don't remember that.

Q. Do you know why it occurred?

A. No, I could only guess at it.

Q. I believe when we stopped to discuss page 44 of Exhibit 16, you were looking for any indication of equipment for sensing coincidence of two dot images?

A. That is correct and I didn't find them, but you did.

Q. Do you agree, then, that that does indicate a sensing

of coincidence?

A. Yes.

MR. WILLIAMS: That what does indicate a sensing of coincidence?

Q. That what is described on page 44 does.

A. No, sir, we are back on the same track.

Q. Referring to page 45 of Exhibit 16, do you find there any reference to coincidence?

A. Yes, sir, the bottom portion of the page starting with the words, "Via a coincidence gate - - -"

Q. Could you read that entry, please?

A. "Via a coincidence gate, a timing circuit SCR is turned on and the red character disappears as the color field changes from green to solid red, except for the blue character which remains." And these words are followed by a schematic of a coincidence circuit.

Q. Was that entry made by Mr. Harrison?

A. Yes, sir.

Q. Now, did you sign that page?

A. Yes, sir, I did.

Q. And on the same date that Mr. Harrison dated it?

A. Yes, sir.

76 Q. Do you recall that entry?

A. How could I possibly recall a nine-year-old entry specifically?

7 Q. Do you recall observing the phenomenon that he describes there?

A. Which phenomenon are you talking about, the color phenomena, Mr. Welsh, or the phenomena of coincidence between two symbols on the screen?

Q. The phenomena of coincidence.

A. If not that day, certainly within a day.

Q. I don't know what you mean.

A. As I testified earlier, this work was done in one small room; I was in and out of this room many times daily, so whatever happened, I was always within hours of knowing what was going on.

Q. And you don't recall the first time when you observed the phenomenon of change of color upon coincidence of two characters?

A. From the record, it must have been this day or the next.

Q. You don't recall personally the incident yourself, though?

A. I can't recall specifically to the day or minute when

I saw an incident such as this and I don't know how many times I have to go through the same explanation that I can only refresh my memory based upon the data that is in front of me and that I was in constant touch with the activity. So I can only infer from that that whatever happened, I was aware of <sup>it</sup> within hours; certainly nobody can be expected to remember particular incidents nine years later.

Q. Well, was this an expected phenomena?

A. Yes, absolutely.

Q. You expected the color to change when the two images were brought into coincidence?

A. Well, certainly, it is a circuit designed for that purpose.

Q. Designed by Mr. Harrison?

A. Well, yes, the specific values were put in there by Mr. Harrison. There is no mystery to what amounts to an ~~and~~-gate, that is all this is. It is simply a transistor, an. RTL logic ~~and~~-gate.

Q. Did you instruct him to make such equipment?

A. I don't recall, I think it is highly likely because we were looking - I think it is highly likely

because we were looking for means of scoring or producing effects from the game action. This is why the SCR timer was built that was shown on some prior page. Something had to activate. On page 41, something had to activate that timer.

Q. Now, that page 41 contains a reference to timing circuit and in parentheses it says to change color after predetermined time, is that not correct?

A. That is right.

Q. So the purpose of that timer was to change color after a predetermined time rather than to detect coincidence?

A. Right. That is not the timer that was intended. I gave you the wrong reference. Mr. Welsh, I would like to correct that. The SCR timer shown on the bottom of page 41 as a timing circuit as shown is a manual operation of an interval timer as you just mentioned, Mr. Welsh. However, in connection with the coincidence circuit, the schematic at the bottom of page 45, it was used. It was tied in. The manual switch, the pushbutton shown was removed and the coincidence signal was applied to the gate of the SCR to change the color of the - probably of



the background on the TV set - as an indication that the two spots had come into coincidence. If you look to the right of the schematic at the bottom of page 45, there are the words "to SCR gate in timing circuit (bypass timing cap and series R)." What he is indicating is that he took away the pushbutton switch and substituted a series resistor to interject the voltage from the collector of the transistor at the bottom of page 45 into the gate of the SCR. So that as coincidence signals came in and generated an output from the collector of the transistor, that got transferred to the SCR and turned it on.

Q. What did a person observing the screen see when this phenomenon took place?

A. Changing color, but I will have to read it more carefully, Mr. Welsh, to see whether it was the whole background color that changed. I believe that is what it was. What one saw was a solid color prior to coincidence and a change in that color caused by the triggering of the SCR which in turn reached into the phase shift network and caused the color to change. So one saw a change of color

right at coincidence. Say from blue to red.

Q. Referring to the paragraph just above the circuit diagram on the bottom of page 45, I think you started to read that. Would you read that whole entry?

A. From the words "via coincidence"?

Q. Yes.

A. "Via a coincidence gate, the timing circuit SCR is turned on and the red character disappears as the color field changes from green to solid red except for the blue character which remains."

Q. Does that not indicate another occurrence?

A. You are right.

Q. In response to detection of the coincidence?

A. Yes, in addition to the color change.

Q. That is the disappearance of one of the spots?

A. Yes. I saw that, but I haven't found the crowbar circuit which does it. No, that is not what happens. What appears to happen is that since one of the spots was red to begin with, as the background turned to red, the square disappeared because it was contiguous with the rest of the background. Why one didn't see an outline of the

tangent delineating the square, I don't know.

If I had to get rid of the square today, I wouldn't dare do it this way. But the symbol was there and as the background changed from blue to red, the symbol blended into the background. There was no coincidence signal at that point blanking out the square, that came later.

Q. But with the colored background as you described it, the square did in fact disappear?

A. Yes, it did.

Q. Now, you just indicated that the crowbar circuit is used to obtain the phenomenon of disappearance of a spot upon coincidence of two spots?

A. That is right.

Q. When was that circuit added?

A. I would have to search through the various notes, Mr. Welsh.

Q. Could you do that? It was about this time, wasn't it?

A. Yes, it must have been very close to this time. I finally came across a reference. In Exhibit 23-29 on July 7.

Q. This is 23-29?

A. I am sorry, it is 23-49 on the 7th of July, '67. Harrison talks about coincidence, but that is in connection with photocell detection of a spot on the screen and the crowbarring of that spot on the screen and there is a schematic sketched in that shows how the spot can be crowbarred.

Q. What do you mean by crowbarred?

A. By crowbarred, I mean short circuiting. That is a power supply term that means short circuiting, cutting out. Generally short-circuiting. In this sense, it means the use of a silicon control rectifier, and that is shown on the schematic on the center right of Exhibit 23-49.

Q. Was this hardware that is discussed on these pages of Exhibit 16 that you have been referring to, and specifically pages 43, 45, 46, actually built?

A. Yes.

Q. And was that ever demonstrated?

A. Yes.

Q. To anyone outside of your group that was working on it?

A. Yes, it was.

Q. And when was the first time that it was so

demonstrated?

A. On June 14 of '67, page 63 of Exhibit 16 indicates that on that date Mr. Etlinger and Mr. Campman witnessed a demonstration. If you would like, I will read the entry on that page.

Q. Please do.

A. "On June 14, 1967, observed and participated in complete set of games described in summary of major games dated 6-6-67 by R. Baer." Under that is Lou Etlinger's signature, June 14, '67, and Herb W. Campman, Jr.'s signature, 6-14-67. And the page or games referred to are attached or clipped onto page 63 of Exhibit 16 and they are in my handwriting.

Q. What was the significance of the demonstration?

A. We had come to the point where a variety of TV games existed in hardware and were demonstratable and we felt it desirable to show it to Herb Campman who was providing the funds out of I R & D Funding for this activity and Mr. Etlinger who was concerned with the patent aspects of the situation.

Q. And was such a demonstration actually given?

A. Yes, sir.

107 Q. And on the date of June 14, 1967?

A. Yes, it was.

MR. WELSH: This might be a  
good time to break for lunch.

(Whereupon, the luncheon  
recess was taken.)

08 Q. (By Mr. Welsh) Referring to Exhibit 16-63A and B,  
were all of the games that are listed there included  
in the demonstration to Mr. Etlinger and Mr. Campman  
on June 14, 1967?

A. Yes, they were.

9 Q. Could you describe those games from the standpoint  
of the player or a viewer?

A. In terms of what?

Q. What they see.

A. What they actually saw and what happened and what  
actually transpired?

Q. Yes.

A. All right; in order, No. 1, the chessboard game,  
the object of that game was to move two symbols  
which are called dots in <sup>the</sup> descriptive text here  
on the screen as though they were checkers or

R

chess figures, Such that the player who reaches his opponent's dot or symbol first is a winner. Therefore, on the screen there were two spots plus a background color which I believe was reduced by spinning a wheel that was attached to the freely rotating shaft of a phase shift potentiometer and I believe that each player took turns guessing at the color that would come up as a result of spinning that wheel; and, if you guessed correctly, you moved one spot forward either up or down or left and right; and, if you guessed wrong, you didn't move - like throwing dice. So the action was one of having two sets of horizontal and vertical controls for moving the spot and a wheel for determining the color which was in effect a set of dice.

Q. Now, the description there of that first chessboard game does not include - I am sorry, the starter is chosen by color wheel selection?

A. Yes. The second game is entitled fox hunt. In that case again, two symbols appeared on screen. One manipulated by one player, the other one manipulated by his opponent, and the script here



calls for using a third person for keeping track of the score as a scorekeeper. The symbols were considered to be a fox and the hunter and the game was chasing one spot with another one with a hit being recorded if the chasing spot caught up with the chased spot.

13 Q. How was that detected?

A. Visually, it appears. That is why we had a scorekeeper. \*

4 Q. And the scorekeeper did the recording of the hits?

A. Yes.

5 Q. So there was no hardware that sensed detection of coincidence?

A. No, sir. The third one was a fox and hounds chase. I had completely forgot<sup>ten</sup> about this one. In this case, we used the scheme shown on page 39 of Exhibit 16 in which an internal audio-oscillator is used to move a spot about. In this case, we moved the spot at such a high rate, 41 cycles being the number listed here, that three spots appeared to be on the screen simultaneously; and the object was for the remaining spot to be manipulated by horizontal and vertical positioning controls by \*

one of the players to avoid being hit by those three audio-oscillator driven spots. In fact, the words here say that the fox, who was the spot which was the spot being manipulated by the player with the controls, was to pass diagonally from upper right to lower left-hand corner five times.

16 Q. What did the other players do?

A. Nothing. It looks like a one on one game. One man against the machine.

17 Q. It says two players.

A. It does say two players, right; what does the second player do? I don't remember. It isn't clear. I would guess that we would take turns.

8 Q. You don't remember?

A. I don't remember. It certainly sounds like we took turns as foxes.

Q. What was the appearance of the movement of the three white spots?

A. Again I would need to check to refresh my memory.  
The words here say that red fox tries to escape  
three white hounds, 41 cycle drives (are spread  
out about 6 to 8 inches) - over the field is missing.  
I think it should have read red fox tries to escape

three white hounds which are spread out about 6 to 8 inches over the field.

20 Q. Did the hound spots move or did they just stay stationary?

A. No, with a 41-cycle drive, which is asynchronous to 60 cycles, they had to move, they could not be stationary.

21 Q. Was it a controlled movement or a random movement?

A. Controlled because applying sinusoidal signals as we did here, the same thing has to happen all over again. Shall I move on?

2 Q. I just had one more question. Apparently only a one-player movable spot was used?

A. That is right, the other spot being machine-moved.

Q. How was it determined whether the fox avoided the hounds?

A. Apparently by visual observation.

Q. Was there some control such as a switch to change the mode of play from, say, Game 2 to Game 3?

A. I don't recall. I would think that either we had a control or we changed clip leads or in some way changed the inputs to one of the delay multivibrators from manual controls to the audio-oscillator.

25 Q. Now, was the player who controlled the fox able to move him other than diagonally?

A. Oh, yes, any direction. The object was to get across generally from one corner to a diagonally opposite corner simply because we arbitrarily decided those were the rules of the game.

6 Q. Would you now explain game No. 4, target shoot?

A. Target shooting involved the use of a photoelectric rifle shooting, if you will, at - under the three different conditions listed here, A, B and C. A being shooting at a stationary white square; B, shooting at a moving white square; and C, shooting at a white square controlled by opponent's joy stick.

Q. Under B, did you call it - how did you characterize that?

A. I don't understand what you mean, Mr. Welsh?

Q. Well, there are three different conditions under which - - -

A. A, B and C.

Q. Under the B condition, what determined the movement of the white square?

A. Simply another participating person turning the horizontal and vertical positioning controls that

determined the motion of the target spot on the screen.

Q. I thought that was condition C.

A. No, condition C is the same thing, but with the use of a joy stick. That is the first time I see a joy stick mentioned.

Q. C is the same as B except you use the joy stick instead of two manual horizontal and vertical controls?

A. Right, and the joy stick is just a mechanism for ganging those two controls together.

Q. What was the nature of the rifle?

A. The rifle consisted of a photo resistive cell , a circuit that sensed difference in the resistance of that photocell as a function of light impinging on it, and put out a logic "one" signal if such light hit the photocell. That logic 1 would be output to an external circuit if, and only if, at the moment that the light was detected, the trigger was also depressed.

MR. WELSH: Can you read that back?

(Whereupon, the previous

answer was read back  
by the reporter.)

33 Q. What was the external circuit?

A. I'd have to go back in the record to refresh my memory. In some cases, it was the same SCR circuit that we previously encountered. If you give me a second, I will look into Exhibit 16. Here is the first appearance on page 53 of Exhibit 16 showing a rudimentary pistol consisting of a photocell and an SCR directly energized by illumination on the photocell. Over the next few pages, not the next few pages, but over that period of time which I believe we will find in Exhibit 23 if you would like me to go there, there is a description of how the rifle evolved from that basic pistol. No, Mr. Welsh, I believe I am getting ahead of myself again. The total circuit in use at that time was that shown - appears to have been that shown on page 53 of Exhibit 16 which consists of a photocell and an SCR.

Q. And what happens when the trigger was depressed and the logic signal occurred?

A. It would appear from the schematic on page 53 that

two things had to happen. As I said earlier, the photocell had to <sup>de</sup>increase in resistance because of the light impinging on it which would raise the DC level on the gate of the SCR through the 33,000 ohm resistor shown on the schematic. And, in addition to that, the switch shown near the bottom of the schematic which I believe is the trigger switch, would have to be - it would have to be - - - I don't quite understand this. If that switch had gone back to B plus, I would have said the capacitor was used to differentiate a positive pulse to the gate to help it turn on the SCR and that both the photocell and the differentiated signal was necessary to trigger the SCR, but it is shown that it either goes to ground or gets opened up and I don't understand that.

Q. Well, did it result in a change of any type with respect to what the viewer saw?

A. Yes, if you look at the schematic, the SCR is shown by an error to the anode to go to chroma gating circuit which is the same circuit we encountered before. The circuit that changed the phase shift in the chroma phase shifter and changed the color

display.

136 Q. By that, do you mean it changed the entire background  
color on the TV screen?

A. Well, that is a question of which came first again.  
We saw that same crowbar, SCR circuit, applied two  
ways before. Once to change color and once to -  
no, we only saw it applied in the terms of its  
ability to change color. So without more paper  
shuffling, I think that was what was intended.

37 Q. To change the background color?

A. To change the background color.

38 Q. Again was there only one spot on the screen?

A. Yes, for the target-shooting game there was one  
spot on the screen, the target spot.

9 Q. How close did the player with the gun hold it to  
the tube?

A. I don't remember, but the fact that this picture  
shows a pistol, not a rifle, there is no gain  
in back of the photocell, so it indicates you  
would have to be within a couple of feet or so.

Q. But there was enough light from the white square on  
the screen to activate the circuit?

A. Yes, sir. A cathode ray tube is a very bright



source of light, 50-to 100-foot-lamberts is easy  
to get.

Q. Would you now describe the fifth game?

A. The fifth game was a color-guessing game. It appears to use the same color wheel used by game No. 1. The object was to predict the color on which the wheel would eventually come to rest, or the color which was produced on the TV set after the wheel came to rest and then score that in accordance to some instructions on an overlay. If you wish, the overlay is here somewhere in our collection.

Q. I don't think it will be necessary to refer to that.

A. It also apparently includes the use of a joy stick  
^ to keep score and that was done by moving a spot up in a vertical cutout on the overlay in a fashion of a thermometer - calibration marks having been put on the overlay - so that you could move the spot upwards to increase scores or downward if you lost scores, whatever the instructions were.

Q. I believe that was shown on an earlier document you looked at this morning?

A. That is right.

144 Q. Now, the bucket filling, that is Game No. 6; and  
the firefighters, Game No. 7, are similar to those  
which you have described before?

A. Yes, they are.

145 Q. Now, none of these games had any circuitry for  
detecting coincidence, did they, at least as you  
have described them?

A. It doesn't appear that way. That is interesting.

46 Q. Mr. Baer, you just commented that you found something  
interesting on page 64 of Exhibit 16; could you tell  
us what that is?

A. Yes, it is a reference to work we did using the  
color TV set we had bought in a different way.  
First of all, as a monitor by stuffing video signals  
directly into the video portion, and I am referring  
to the schematic on page 64 of Exhibit 16. And  
putting color outputs from our chroma circuitry  
directly into the color circuits of the receiver.  
It is basically the use of the receiver as a  
monitor. Specifically for the target-shooting  
game.

Q. I don't find the term "monitor" on that page?

A. No, you won't, it is not there.

148 Q. Did you have a monitor?

A. No, my earlier definition, right or wrong, of a monitor is a TV set without the front end. That is, without the RF and IF portions. That is how monitors evolved.

49 Q. Now, the second page of Exhibit 63, that note is marked 16-63B, contains a note at the bottom, is that in your handwriting?

A. Yes, it is.

50 Q. What does that note say?

A. It says, "The above games were demonstrated to L. Etlinger and H. Campman, 6-14-67; 8 to 9:30 <sup>p.m.</sup> ~~A.M.~~  
See page 63. And on 6-15-67 to R. C. Sanders, Jr.; H. Pope and D. Chisholm."

Q. Was that an unusual time for a demonstration, 8 to 9:30 p.m.?

A. No, we worked all sorts of weird hours in those days.

Q. When you say we - - -

A. Engineers and engineering personnel at Sanders in general were not known for keeping short hours.

Q. And do you classify Mr. Etlinger as engineering personnel?

A. Well, I think anybody in any position of authority was authorized to stay as long as he wanted to.

154 Q. And was Mr. Campman engineering personnel also?

A. Yes, Mr. Campman, of course, is corporate director of I R & D and he was also a member of the technical staff and at one time was chief engineer of the Instrument Division.

55 Q. And was there any reason for giving this demonstration at night on that occasion on June 14, 1967?

A. I don't recall, there must have been.

56 Q. Was the demonstration repeated on June 15 for Mr. Sanders, Mr. Pope and Mr. Chism?

A. Yes, it was.

7 Q. Is it possible that that had been a scheduled demonstration and you were working late the night before to perfect the demonstration?

A. It could be.

Q. Mr. Sanders was president of Sanders Associates at that time, was he not?

A. That is correct.

Q. Now, what was Mr. Pope's position at that time?

A. Well, he was either officially or at that time perhaps unofficially the executive vice-president

of the company and my boss.

160 Q. And Mr. ~~Chism~~ Chisholm?

A. At that time he was vice-president and I believe treasurer of the company at the time. He is still a vice-president of Sanders now.

161 Q. Was either the demonstration to Mr. Etlinger or Mr. Campman or the other demonstration the next day to Mr. Sanders, Mr. Pope and Mr. Chism given for any particular reason?

A. I would say that they were given in order to introduce those people who had never seen TV games before, to their existence. We solicited comments and probably also to solicit suggestions as to what to do with it all in terms of final realization from this effort.

2 Q. Did you receive any comments from any of those persons?

A. I can only guess; I am sure I did.

Q. Your notes don't reflect any particular comments?

A. No, they do not.

Q. Do you recall generally the reaction of the various people to the demonstrations?

A. Well, I think everybody was fairly impressed with

the novelty of the demonstration as well as the succeeding demonstration. No one seemed to be too convinced that we would ever make much money from TV games.

165 Q. Did anything ever transpire as a result of the demonstrations?

A. Oh, yes.

166 Q. What happened?

A. It had the necessary salutary effect <sup>on</sup> of my continuing receipt of company funding. \*

167 Q. Did you receive further funding directly as a result of the demonstrations?

A. Yes, I am sure that was a contributing factor.

168 Q. The development did go on beyond that point, I take it?

A. Yes.

169 Q. What happened after that?

A. I continued to work on the project. I think really this was the first exposure to senior management. Campman and Etlinger had been aware of the activity because they were both involved previously and they were funding the activity. This was probably the first time that Poyden Sanders saw it and the

first time that Pope saw it, although I had talked to Harold about it before since he was my boss.

170 Q. Was a special appointment made with them to give the demonstration?

A. Well, normally it takes a special appointment to demand their attention and time.

71 Q. Was that a normal occurrence?

A. I would say so.

72 Q. What, if anything, did you do toward furtherance of the TV game project after that?

A. Well, I continued to direct the program at the conceptual and at the working level on the bench in terms of supervising Harrison and Bill Rusch who came on board probably not too much later than this.

3 Q. Can you recall specifically what further development took place after this demonstration?

A. You mean, Mr. Welsh, within days or weeks or months?

Q. Well, whatever transpired.

A. Well, we went on to go through a whole series of developments. TV games of increasing complexity. Some based on my ideas, some based on Rusch's ideas, some based on all of our ideas.

175 Q. Could you refer to these documents and tell us what happened next?

A. How would you like me to do that, go page by page through Exhibit 16?

176 Q. Well, any development that you think significant, refer to it.

MR. WILLIAMS: Feel free to refer to the documents.

177 Q. I am just trying to find out what happened, when different changes were made, what they were.

A. Maybewhat I ought to do , Mr. Welsh, is to look for major milestones when discrete pieces of hardware were completed and playable as an aggregate, not simply as a subcircuit experimented with on the bench, but as a finished unit.

178 Q. That would be a good place to start; and perhaps if we wanted to go back for a particular item, we might do that.

A. At the moment, I don't promise to get the sequence right. It looks as though by August 2 we had a machine which used plug-in cards to make it more useful in terms of, I think, both servicing and modifications to various parts of the circuitry and



I am not sure, this might have evolved later, perhaps in terms of changing games. I don't know what the number is we attached to that model, but it is here and it is a gray metal Budd box. \*

179 Q. Now, when you gave that date of August 2, did you mean 1967?

A. 1967. I am looking specifically at 16-82A, a schematic done by Harrison on that date which shows two horizontal - what does it show - it shows the beginnings of that unit with facilities for generating horizontal and vertical sync., one spot. The photocell gun slightly modified with an emitter follower I noticed between the photocell and the SCR. An RF oscillator to be able to transmit composite signals to a TV receiver. There is no chroma circuitry here, so what we have come to at the moment is a cleaned up version of the breadboard we used for the demonstration with some parts stripped out and some parts improved. Specifically things such as gating, horizontal and vertical output signals, and the spot generator is done differently. Various other differences in detail. I am mistaken, I said there was provisions

for generating one spot, there are provisions for generating two spots. As I go through Exhibit 16, I find further references to the rifle, which is now a rifle, no longer a pistol, with improved circuitry particularly with respect to the triggering. 16-90A is the reference I am looking at. It is also the reappearance of a crowbar circuit on page 91 of Exhibit 16 which enables one to produce symbols on a screen without an RF oscillator, which was important in the cable application of TV games. If you will give me a minute to look through Exhibit 23, I will try to look through the same time period and see what else there is.

MR. WELSH: May I have that last answer back?

(Whereupon, the previous answer was read back by the reporter.)

(Discussion off the record.)

79 Q. Now, Mr. Baer, when we were off the record, Mr. Williams indicated that you had some statement you wanted to make about your previous testimony

with respect to what was demonstrated on June 14 and June 15, is that correct?

A. That is right, sir. In the interim, I recollect that we picked up a transcript of a tape done which was used to introduce the games to Mr. Sanders and Mr. Pope specifically by playing right through the loudspeaker of the TV set on which the games were being demonstrated. We built a  $4\frac{1}{2}$  megacycle FM oscillator, summed that into the video summer to allow sound from an audio cassette player to be reproduced by the demonstration TV set. That tape I am holding in my hand. It is a cassette labeled TVG, meaning TV games, demo, 1967, Side B; and just labeled TVG on Side A. There is a transcript for it which is Exhibit 27-1 through 27-5, which essentially describes the same games we went through a short while ago here except for the words here are the words as they are spoken on that cassette tape and they are not a description, but an introduction to the various games in general with some sort of remark like "let's go or let's play" at the end of each introduction. In addition to that, I would like to go back for a minute,

\*

Mr. Welsh, to 16-63A and I believe I made an error with respect to game No. 2, the fox hunt or steeple chase. In the center of that paragraph says all action ceases if A, a hit is made turning screen red; or, B, if no hit is made after saying "three." I believe in response to a question on whether there was coincidence taking place in the circuitry or whether that was being registered as some function in the circuitry and the change in the display, I think I said no and this indicates that we did activate - we did detect coincidence, we did turn the SCR on which did change the phase shift and cause the color to change. And just in case I was wrong before, I would like to see it corrected. All this again with reference to the gating circuit on the bottom of page 45 in Exhibit 16 and the SCR circuit on the bottom of page 41 in Exhibit 16.

Q. Do you have a cassette player on which we might hear the tape?

A. Not today, Mr. Welsh. If you like, I will bring one in tomorrow.

Q. Will you please, Mr. Herbert has indicated a desire to hear it.

MR. HERBERT: If you don't mind, rather than taking up the time at the deposition, I do have a player in my room.

MR. WILLIAMS: I haven't heard it either.

MR. HERBERT: I hate to take up deposition time for a half hour or an hour tape.

THE WITNESS: No, I would say it is just <sup>ase</sup>this five pages spoken.

MR. WELSH: Maybe we can meet at nine-thirty in the morning and do it.

182 Q. Now, Mr. Baer, if you would please, as you put it, look for milestones, changes of the circuitry where discrete pieces of hardware were completed and playable as an aggregate?

A. All right; in the Exhibit 9-89, which is dated September 12, '67, we find the schematic done by Harrison which is essentially the culmination of work in the preceding two months and encompasses just about everything shown in 480.

Q. That is patent No. 3, 728,480?

183 A. That is right. For example, the delay multivibrator

circuitry shown in 480 such as that of Figure 5C, the and gating of the vertical and horizontal portions of the delay circuits in 5C of that patent, and the rest of the details in Figures 5F, 5E, all are essentially as they are depicted on 9-89. The work for which started early in July. I am referring now to Exhibit 16, page 74, the bottom of the page.

184 Q. Could you slow down just a little bit, please?

A. Yes, I am sorry.

185 Q. That is page 74 of Exhibit 16?

A. Yes.

186 Q. Could you go on, please?

A. On that page, Harrison describes in words and on the next page shows schematically on page 75 the simplified way of generating a delay for positioning a spot on a screen using only one transistor versus the two that were shown in all previous schematics; and it is that circuit that is shown in the 480 patent, Figure 5C. And, as you go through the pages, 75 on forward in Exhibit 16, without taking up too much time, there are further developments of such things as the horizontal oscillator circuit, the rifle, all of which culminated sometime in

(Whereupon, Exhibit No. 29  
was marked for identification.)

89 Q. Would you now, please, identify for us what has  
been marked as Exhibit 29?

A. Would you like me to correlate what we are looking  
at with what is on the schematic on 9-89?

90 Q. I would like you to identify it generally first  
and if there is a correlation with 9-89, then tell  
us what that is.

A. Well, the exhibit you referred to is a gray Budd box  
<sup>is</sup>  
~~as~~ a complete TV game, self-contained in that it  
has its own batteries. It has two horizontal and  
two vertical positioning knobs, a pair of each being  
located at opposite sides of the box so that  
two players can participate in the game with the  
box. Internally it has the provisions for three  
plug-in cards, two which are still in position.  
In addition to that, it has circuitry laying down  
flat on the base of the box which are also identified  
on the schematic as modules. It also has an outboard  
circuit hung on one side which is evidently something  
that came along later than the schematic in 9-89  
indicates and offhand I don't know what it is.

191 Q. Do you know who would know that?

A. Well, with some luck, Harrison might remember what all that is, especially if one spent the time tracing it.

192 Q. But except for that, does Exhibit 9-89 accurately depict the hardware that is represented by Exhibit 29?

A. Yes, it has the plug-in cards, the two spot generators shown on the top center and top right of 9-89.

193 Q. Do they have the legend dot generator No. 1 and dot generator No. 2?

A. Yes, that is correct. Also the horizontal oscillator, the vertical oscillator, the RF oscillator and summing amp shown to the left of 9-89 are shown on the chassis laying down flat horizontally. In addition to that, the center socket which was meant for the chroma circuit is here, although the chroma card somehow doesn't seem to be here and I strongly suspect now that that outboard circuit - no, it isn't. I thought it might be a chroma generator, but it isn't. But essentially, to answer your question, all the elements of 9-89 are here



physically and easily identified.

194 Q. Are there other parts such as were used with the rifle that are present in Exhibit 29, but do not show on Exhibit 9-89?

A. No, and I can't seem to find either provisions for connecting a rifle nor is it indicated on the schematic, so that says that all that work that was taking place on the rifle didn't get into this physical chassis. Furthermore, I just found under 9-85 and 9-84 pictorials of the physical parts layout for the plug-in cards including the missing phase shifter card. If I seem to have trouble, Mr. Welsh, it is because the stuff, this material, is out of sequence chronologically and I am having a devil<sup>^</sup> of a time shuffling papers here to see what the sequence really was. For example, 9-84 which we just referred to is dated June 15 or thereabouts and then as I go on in the documents, I am back in May and then suddenly in September, so that accounts for the problem that I have got. I am not sure I know what I am trying to show here. I think we are trying to find the rifle which would flush<sup>e</sup> out the 480 description. We already

went through that, I believe, in Rusch's notes because they were all tied together.

195 Q. You mean Harrison's notes?

A. Yes, Harrison's notes, I am sorry. Right here in a set of documents which you referred to earlier as being out of sequence and which date from 7-7-67, Exhibit 23-49, through August 10, '67, Exhibit 23-71, not all of which have to do with the rifle, but a lot of the pages have to do with rifle development. So during the same period as the Budd box came into being, the rifle was also being worked on and some fairly expensive discussion on it - light measurements during the end of July with respect to the photocell. Exhibits 23-59 through at least 64 all deal with the photocell. Then again 66 deals with the photocell; and by that time, judging from the schematic on 23-66 on August 3, he is pretty far along on the rifle circuit. It seems as though the rifle work commences again in October as shown on 23-102. Also 23-111 shows another iteration and I would like to stop right here and see how close that comes to 480 because I think we are almost there. That is pretty close. 23-111, if we took

more time, we would probably find a couple of earlier ones. It is very close schematically to figure four of the 480 patent. So at least by November 1, '67, the rifle work had progressed to the stage shown in 480. I guess that takes care of 480 with the exception of Figures 9 and 10, if that is of any interest to you.

196 Q. What do figures 9 and 10 relate to?

A. Figures 9 and 10 relate to sending what we called coded spots in a television transmission and sensing those spots by pointing a photopen or light sensor at these spots and detecting the nature of the code in the spot. That code is described in the patent consisting of a series of either odd number or even number unblanked symbols on the screen and the flipflop circuit following the photocell winds up in either one state or another state depending on whether an odd or even number of pulses got in there. And by arranging as such the multiplicity of spots, squares shown on the screen, one of them is different in terms of odd versus an even sequence, the circuitry can differentiate between that ~~as~~ <sup>which</sup> has an even series versus all the others that might have

an odd series. This is a very simple form of binary coding and the whole thing is a game that has very little to do with the rest of the TV games that we discussed here. It is entirely different.

197 Q. And we haven't discussed the circuitry for that?

A. No, we haven't, except that it borrowed some of the experience from the pistol work and the rifle work and used essentially the same circuits with the exception of flipflop. I believe that takes care of 480.

198 Q. Before you put that away, when was Exhibit 29 constructed in relation to the construction of 9-89?

A. 9-89 was constructed prior to 9-12.

199 Q. You mean Exhibit 29?

A. Exhibit 29 was built in accordance with 9-89 and was constructed on September 12. Unfortunately, there are no dates on some of the pictorials showing the layouts on the cards, but I guess it is fair to say that it came together in July and August of '67 and was completed sometime before 9-12-67.

20 Q. And how do you fix that date?

A. Because the complete schematic shown on 9-89, which is a cleaned up version of all of the previous hand-drawn sketches and subschematics, is dated 9-12-67.

201 Q. And who prepared that schematic 9-89?

A. Mr. Harrison.

202 Q. Could I see your copy of that Exhibit 9-89, please?

A. Sure.

MR. WELSH: Off the record.

(Discussion off the record.)

203 Q. Now, Mr. Baer, I notice that Exhibit 9-89 has a number or has a legend, Fig. 6 in the lower right-hand corner. Do you know what significance that has?

A. I don't recall.

204 Q. And also Exhibit 9-90 has Fig. 5.

A. Well, my guess is that those are the figure numbers we appended to those pages when we submitted them as part of the disclosure for patent application.

205 Q. Is that disclosure - - -

A. That is just a guess.

206 Q. Is that disclosure here? Do you have a copy of that

among your papers here?

A. Are you asking me?

Q. Yes.

A. Of the original disclosure?

Q. Yes.

A. It might be in this room, but I wouldn't know where it is.

Q. Or do the papers that you have collected include any copies of that?

A. No, it wouldn't be in this collection.

(Discussion off the record.)

Q. You referred prior to the recess to the possibility that the numbers Fig. 5 and Fig. 6 on Exhibits 9-90 and 9-89 might have been numbers assigned when you made some report; now, a search has been made for that report during the recess and it was not found, is that correct?

A. That is right.

Q. Do you have any other idea as to what those figure numbers might have meant?

A. Well, it is possible that in making a report to the I R & D office, either monthly or quarterly or

some end of period status report, that I put a number of schematics together in addition to textural material and, as a result of that, numbered the pages so that they would correspond to references in whatever text I wrote to go with them, but that is only another guess. That is typically what we do when you generate schematics in the course of an activity; at the end of the period when you write a summary, you refer to them and very often for convenience we number them. Mr. Williams just turned up an I R & D folder on Project NKM task code into which the same schematic is bound along with textual material. Also the block diagram which we have marked 9-90 and along with it is a report jointly written by Bill Rusch and myself as part of a monthly status report and the figures are indeed numbered 5 and 6 because they are numbered 5 and 6 in this report.

12

Q. And that report was marked as Exhibit 28?

A. I am sorry, I didn't notice that, that is correct.

MR. WELSH: I think I would like to ask the reporter to mark the pages in this report successively as 28-1 and so on starting with

the pages on the inside front cover and going through to the back of the book.

(Whereupon, Exhibits 26-1 through 26-29 were marked for identification.)

Q. Now, Mr. Baer, do copies of the circuit block diagrams of Exhibits 9-89 and 9-90 appear in Exhibit 26?

A. Yes, they do as Figures 5 and 6.

Q. Is Exhibit 26-17 the same as Exhibit 9-90?

A. That is correct, sir.

Q. And is Exhibit 26-18 the same as 9-89?

A. That is right.

Q. Now, I asked while the reporter was marking the pages of Exhibit 26 if you could find the earliest circuit diagrams showing the portion of Exhibit 6-89 in the lower right-hand corner entitled dot coincidence and crowbar?

A. All right; the earliest that I have been able to find, Mr. Welsh, is on 23-69, September 6, '67, the bottom right-hand corner. It is essentially the same circuit with some minor variations in parts values, but that is it.



Q. Now, did you characterize that coincidence circuit as a diode logic circuit?

A. Yes, it is a diode ~~and~~ gate. It requires specifically, if you look at 9-89, it requires that both terminals X and Y in the lower right-hand corner be at logic level 1, say at Vcc, which is 9 volts on this schematic, <sup>in</sup> order for a logic 1 to be output by diodes 401 and 402, which is then transferred to the gate of the SCR through diodes 403 and 404, and that is the same as the picture shown on 23-69, except for parts values on 9-6-67 by Harrison.

Q. And that is at the lower - - -

A. Lower right-hand corner of Exhibit 23-69. And as cleaned up on the next page, 23-70, a day later, with changes in parts values and some indication of where parts physically were that relate directly back to the gray Budd box here, Exhibit 29.

Q. Now, you used different elements in earlier coincidence gating circuitry, did you not?

A. Yes, we used transistor logic as shown on page 45 in Exhibit 16, the bottom of the page.

Q. Now, when you went to diode logic on Exhibit 9-89, did you also consider going into using integrated

circuits?

A. I think that had been considered earlier. There are a whole series of sheets in Exhibit 23 which I will have to try and get back to to see where they fit in in terms of chronological time before I can answer that question. To the question of whether that diode design was in some way influenced by considerations of going to IC's, integrated circuits, the answer has to be no, because there is no reason why we shouldn't pick diode logic which had been around for ten years - more than that, twenty years - prior to September, '67, and was a perfectly valid way to go. IC's were considered. The only evidence of it is on 23-92 on October 10 which is somewhat later where Harrison did a schematic of the - some IC and gates used or inverters used as delay generators and the notation on the bottom of the page said that he tried to use integrated circuits to cheapen circuits, but doesn't appear feasible.

1 Q. Did you then discard the integrated circuit way to do it as too expensive?

A. Well, not just yet because <sup>as</sup> you go on to 23-95,

for example, and see the use of some Fairchild micrologic integrated circuits used as horizontal-vertical oscillators and again the notation on the bottom of the page says "the IC's work, but no cheaper and consume more power." So we actually breadboarded the logic and the oscillators at that time and made a computation of power and cost and in view of the fact that this was going to be a battery-operated device as to power; and on the view of cost, that IC's just didn't make the grade at that time.

2 Q. Our copy of Exhibit 23-95 is not too clear, what is - - -

A. If you are looking for the inscription inside the schematic, it is FI~~UL~~; and FI is Fairchild micrologic and then comes some sort of a 9000 number. It is 990028 in all four cases, which I am pretty sure was an early form of Fairchild diode transistor logic, DTL. Basically the same thing that we did with discrete components here.

3 Q. Now, I believe you testified that Exhibit 29 was originally constructed in accordance with Exhibit 9-89?

A. Yes, sir.

4 Q. What changes have been made in Exhibit 29 since its original construction in accordance with Exhibit 9-89?

A. Well, I certainly can't answer that from memory, Mr. Welsh. I also don't recognize as we said earlier the add-on circuit board that is hanging outboard alongside the unit.

5 Q. Do you know when that was added on?

A. I haven't any idea what it is or when it was added on. I think if you need an answer to the question of what changes were made, we are going to have to defer that until we get through additional papers.

6 Q. I believe you indicated Mr. Harrison probably would know, or do you think it might be easier to find it in the papers?

A. I think he would have the same problem I have. This is No. 3 in the series of many, many models and how could I possibly remember the many times we cut up a piece of equipment and modified it and used it for other purposes.

7 Q. What was this model used for?

A. It was intended to lay the basis for a pricing exercise for a basic TV game that did the things

that we saw earlier in connection with the earlier demonstration that allowed two spots to be shown and allowed a spot to be crowbarred and permitted the chase games.

Q. Now, when you say allowed a spot to be crowbarred, that means to cause the spot to disappear?

A. To disappear upon coincidence with another spot.

Q. Now, I don't believe that we have seen any indication of that prior to Exhibit 9-89. The only indication we had was change in color upon coincidence.

A. You are absolutely right. We were looking for it and couldn't find it, but it is in here. By in here, I mean on 9-89, on the schematic of 9-89, the provision for crowbarring one of the so-called dot generators, primarily dot generator No. 1 in the top center of the page, at terminal D, definitely exists. And, if you look at the lower right-hand corner at the SCR, the G. E. SCR shown there on 9-89, you notice that the anode of that SCR also goes to terminal D right under the word reset. That D ties onto the junction of those two resistors up at the top of dot generator No. 1 labeled R105 and

R106. And when the SCR breaks down, it grounds terminal D, removes voltage from the collector of Q103 (it is hard to read), at any rate, the summing transistor, and therefore crowbars or eliminates, wipes off the spot generated by this dot generator from the screen.

0 Q. Now, the other diode logic circuitry that you referred to in Exhibit 23-70 was simply the gating, was it not?

A. Yes, it was the gating of the coincidence pulses. Of two pulses to form a coincidence pulse so as to turn on the SCR.

1 Q. The date of that was September 7, 1967, is that correct?

A. Yes, sir.

12 Q. You did search these documents, did you not, for anything that would show the coincidence and the crowbar?

A. Yes, but the date actually should be - the first appearance of that circuit - should not be 9-7, but 9-6 on the previous page, 23-69.

33 Q. I am sorry, yes.

A. And you notice that that circuit on that page, on

23-69, appears right next to another schematic which shows resistive summing and gating through a transistor much like that shown on the bottom of page 42 in Exhibit 16. So it sure looks like the evolution from that gate circuit ~~from~~<sup>to</sup> the diode circuit took place on this piece of paper at this time. \*

Q. Is that a crowbar circuit, then, on the bottom left portion of Exhibit 23-69?

A. No, it is the gate circuit which - - - It is the gating logic which energizes the gate of the SCR.

Q. Now, that includes the transistor in the left portion of the lower part of Exhibit 23-69, does it not?

A. Yes, as I said earlier, that is the way that we evidently did it at that time as shown on page 45 of Exhibit 16 which is much, much earlier than the date on 23-69, so reconstructing his thought processes, he copied out what he did once before and said, how can I do it better and came up with the diode logic.

Q. So this was work done by Mr. Harrison?

A. Yes, or by several of us sitting together putting our heads together.

Q. Well, the circuit we went through this morning was the coincidence of two dots?

A. No, even earlier than that.

Q. There was a timing circuit on page 41 of Exhibit 16 to change color after predetermined time.

A. That is right, that is what I had reference to and that is what I am searching for, thank you.

Q. So that is still the timing circuit that operates after predetermined time rather than in response to detection of coincidence?

A. Yes, but somewhere later I am trying to find it again - - -

Q. Well, it is two pages later.

A. Yes, on 45 in connection with the gating coincidence circuit on the bottom, we show that gating circuit driving the SCR gate.

Q. That relates to the two dots on page 44?

A. Yes, that is correct. All right; then what you said earlier, Mr. Welsh, that the transistor gating coincidence circuit was used in connection with two dots, is that correct?

Q. That is shown at the bottom of page 45 of Exhibit 16?

A. Right.



Q. So the first instance of the crowbar circuit with the dot coincidence gate is on Exhibit 9-89?

MR. WILLIAMS: Mr. Baer, don't hesitate to take your time and look through all the documents if you think it is necessary before you can say what the first instance was.

THE WITNESS: Did you say the first indication of coincidence between two player spots?

Q. Right.

A. Decided on - - -

Q. Well, the first incidence of detecting coincidence of two player spots and causing one of the spots to disappear is on Exhibit 9-89. That is the first time the crowbar has been combined with the dot coincidence?

MR. WILLIAMS: I think that is contrary to previous testimony, as I recall.

MR. WELSH: He hadn't found any earlier information.

MR. WILLIAMS: Page 45 refers to the character disappearing.

MR. WELSH: But that is the

disappearance with the change in the background color.

MR. WILLIAMS: But it is the disappearance of the spot and that is what you said.

MR. WELSH: I said crowbar.

MR. WILLIAMS: , I realize you said that in one of your questions and the last question I thought I didn't hear that.

MR. WELSH: I intended it to mean crowbar, thank you for helping me to clarify it. So that there would be a disappearance of the dot regardless of the presence or absence of color change in the background color.

THE WITNESS: I believe the answer to the question is, yes, though I don't preclude having seen other documents in this big pile of papers here that might indicate that we did it some time earlier.

Q. Was Exhibit 29 as it was constructed in accordance with Exhibit 9-89 actually used to play games using a TV set?

A. Certainly it was.

Q. Are there any reports of that usage?

A. I don't know. If you will let me look ahead - for that matter, certainly the I R & D report we discussed a little while ago, Exhibit 26, covers this unit at least in part. On page 4, that is document No. 26-11 under the heading of digital circuit system is a description of what amounts to essentially the hardware in Exhibit 29 shown schematically as Figure 6 which is our Exhibit 9-89.

Q. Now, did you also state that Exhibit 9-90 which is Figure 5, as I understand it, referred to on Exhibit 26-11 is a block diagram of Exhibit 29?

A. Yes, it is.

Q. Now, this portion, Exhibit 26-11 which you referred to, simply describes the circuitry, does it not, of Exhibits 9-89 and 9-90?

A. Yes, but it makes a point of distinguishing between those circuits and the ones built by us as designed by Rusch, so the whole report really covers two different types of systems, <sup>or</sup> of what we call the digital circuit system which is a description of the circuitry 9-89 and the rest of it is a description of Rusch's way of doing the same thing;

\*

and, in that sense, 9-90 is a generic block diagram of any game of this capability and that is why it was stuck in this report.

Q. And even though it does refer to digital?

A. That is right, even though it is a block diagram that Harrison did in connection with assembling all the data on Exhibit 29 for a cost exercise and other purposes, since it is generic I used it in this I R & D report and say here is a typical game block diagram and then the report goes on to distinguish between what we used to call the analog spot generation, that is Rusch's slicing circuits as distinguished from what we call the digital circuit system which is the circuitry that uses basically diode and gating and diode transistor logic which we find on 9-89 and in Exhibit 29. As a matter of fact, a conclusion is drawn at the end of the report.

Q. Are there any other reports referring to the circuitry of Exhibit 29 and any testing of that circuitry?

A. None that I am aware of, Mr. Welsh.

Q. After Mr. Harrison finished his cost analysis with

respect to the circuitry of Exhibit 29 as conducted in accordance with Exhibit 9-89, what was done in furtherance of the TV game project?

A. Again, Mr. Welsh, I would have to look ahead into the papers to refresh my memory.

Q. Is Mr. Harrison's cost analysis included in these documents?

A. Yes, it is, Mr. Welsh. It is a bill of materials on page 92 of Exhibit 9 and that is followed with more formal electrical parts lists starting with 9-93 and finally concluding on 9-101 in which he took each modular element in the machine and priced it as to electronic components separately and I believe summed up the cost of these individual sheets on that last page 9-101.

Q. This cost analysis, then, is of 9-89 circuitry which is referred to as the digital circuitry on Exhibit 26-11?

A. I believe so. For that reason, it was stapled to the schematic. I would have to double-check the parts count against the schematic to be 100 percent sure of that. In terms of timing, it is the only thing it can be.

Q. After you completed Exhibit 29 in accordance with Exhibit 9-89, was there any effort for further funding of the TV game project?

A. Yes.

Q. I refer you to Exhibit 26 and specifically Exhibits 26-4, 5, 6 and 7 and ask if those exhibits relate to requests for full funding?

A. That is correct, that was a request for funding to take us from September into November of that year.

Q. Was that request made as a result of any of the work in connection with Exhibit 29?

A. Well, indirectly it was made in view of the fact that continued work seemed desirable to <sup>perfect</sup> ~~effect~~ the equipment and improve the equipment and funding had run out.

Q. Referring to Exhibit 26-4, at the bottom of that page is a statement, demonstrated working engineering unit?

A. That is correct.

Q. What unit was that?

A. I just don't know, the inference is that it was Exhibit 29 because that is what we described in

this report.

Q. This particular report, Exhibit 26-4 through 26-7?

A. No, I meant the report, 26-8 all the way through 26-18.

Q. Now, the date of the schematic, Exhibit 9-89 for Exhibit 29 was September 12, 1967?

A. Right.

Q. And the date of the report that you just referred to - - -

A. Is August.

Q. Is August 5, 1968, is that not correct?

A. Right. I don't see any conflict there. The money was requested about a month after the report.

Q. Again I draw your attention to that, this is 1968 for the report and the date of the work on Exhibit 29 I understood to be September?

A. I am sorry, I didn't see that. This is the final report reporting on activity almost a year earlier, that is why. Could I have the question again, I lost track of it, Mr. Welsh.

Q. What was the engineering unit which is indicated here as having been demonstrated?

A. My answer was I believe it was Exhibit 29 and then

I got off the track by trying to relate that to the report which didn't appear until a year later. So let's say that it must have been 29 simply because that corresponds in time to the appearance of all the data that we just went through in Exhibits 9-89, 9-90, etc. All the cost data.

Q. Those were just dated a couple of days before the September 15 request, were they not?

A. That is right, three days before, 9-12 to be exact.

Q. Now you are referring to Exhibit 9-89 which is the circuit diagram, I think?

A. Yes.

Q. And you will find the pricing information of Exhibits 9-92 to 9-102 bear dates for the most part in October and into November?

A. Yes. You notice that price data also carries the task code NKMAA in this case, which is the same task code as that on 26-4, so that work, the pricing exercise, was done under funding provided by the I R & D plan and authorization in Exhibit 26.

Q. Does that authorization appear in any particular page of Exhibit 26?



A. Yes, it first appears on 26-2 and on the center of that page it refers back to the 15 September date, '67, which is the 26-4 document we have been looking at. So you will notice that the papers in this exhibit are bound in here in reverse order chronologically with the earliest one on the bottom and the latest on top. First comes the request for funding, an outline of the approach and then comes the funding and finally comes a stop order.

Q. And where was the reference to Exhibit 26-4?

A. Right in the center under objective and scope.

Q. That part of 26-2 refers to I R & D plan NKM dated 15 September, 1967?

A. Yes, which is Exhibit 26-4.

Q. What is Exhibit 26-1?

A. A stop order issued on 31 January, '68. If you look next to the word stop order, the large "R," there is a date January 31, '68. It indicates on January 31, '68, <sup>that the</sup> special sales order which was open<sup>ed</sup> on 4, October, '67, <sup>the</sup> date in the upper right-hand corner, ~~The~~ task code NKM, was stop-ordered. That meant no further charges could be made against that work order after January 31, '68.

Q. Now, your final report covers what pages of Exhibit 26?

A. 26-8 through 26-18.

Q. What is the date of that report?

A. August 5, '68.

Q. Which is sometime after the January 31, '68, date of the stop order of Exhibit 26-1?

A. That is right. There is a simple reason for that, our fiscal year ends on August 1 and at the end of the fiscal year final reports on all I R & D programs are required not just internally, but also by law by the Government. So right about the beginning of August, the big push is on to get the final reports into the I R & D file.

MR. WILLIAMS: Could you repeat that answer, please?

(Whereupon, the previous answer was read back by the reporter.)

Q. Referring to Exhibit 26-20, could you tell us what that is, please?

A. That is a monthly status report on the standard form

in use by the I R & D office which is dated November 7, '67, and purports to show the progress made by Bill Rusch under task NKM during the prior month. That is the month of October.

Q. And what does it state with respect to progress in October?

A. It says under activity, "See reference D memo." And by reference D memo, this is October, '67.

Q. Perhaps that is referred to in program progress, the next section above what you just read?

A. Well, you are right. Under program progress, it states that a new system concept has been implemented. It offers cost savings and permits new classes of applications. For more detailed description, W. T. R., which stands for William Rusch, and it is dated 11-7-67.

Q. Do you know what system concept he was referring to?

A. We will have to go to the document to make sure, but those system concepts included his diode slicing circuit, which were a new form of spot generation and may have included by this time the playing of active sports games such as ping pong, but for that

we would have to go into the record and see whether that happened in October or later. I don't recall without reference to the documents.

MR. WELSH: Shall we adjourn and reconvene at nine-thirty tomorrow morning?

MR. WILLIAMS: Nine-thirty is fine.

(Whereupon, the deposition in the above-entitled matter was adjourned at 5:05 p.m.)

Ralph H. Bader  
Deponent

THE STATE OF NEW HAMPSHIRE )  
COUNTY OF Wilkesborough ) SS.

Subscribed and sworn to before me this 10th  
day of May 19 76.

Marilyn E. Trapala  
~~Notary of the Peace and/or~~  
Notary Public

Marilyn E. Trapala  
Notary Public

My Commission Expires March 10, 1980

EXHIBITS

<u>No.</u>	<u>Page</u>	<u>Description</u>
29	60	Gray Budd box, chassis No. 3.
26-1 through 26-29	69	Pages bound in Exhibit 26.

Q. Who had the idea of using a crowbar with a coincidence gate to make one of the spots disappear upon coincidence of the spots?

A. I can't possibly recollect that. I don't want to take credit for everything.

Q. So it could have been Mr. Harrison or Mr. Rusch?

A. Well, it is impossible to say right now.

Q. But you don't remember specifically thinking of that yourself?

A. I don't specifically remember it, but it is a very common circuit. It doesn't require much imagination.

Q. Well, coincidence was first detected, was it not, using a change in color as the phenomenon which occurred upon detection of coincidence?

A. That is right, in connection with the pumping game, the firefighting game. It was the coincidence then. First used in connection with coincidence with a player's symbol on the screen and output from the delay multivibrator that changed the horizon line as in the firefighting water pumping game.

Q. Is there a circuit that shows that?

A. Yes, we went through that this morning, Mr. Welsh.

August and was documented on November 12 on 9-89 as a complete overall schematic of an operable game which was a physical entity and I believe is that box here which we referred to earlier as the gray Budd box with plug-in cards. If you look at 9-89, there are dashed lines drawn around each subcircuit and I think those dashed lines represented the plug-in components, but I am not certain at the moment. In any event, Mr. Welsh, the 9-89 essentially represents the 480 patent with the exception of the rifle. That must be documented elsewhere.

187 Q. Have we marked what you have referred to now as being the gray Budd box earlier?

A. No, that is not it, sir. The answer to your question, Mr. Welsh, is, no, we haven't looked at it before.

188 Q. That has a No. 3 written on masking tape on the outside of one end, is that correct?

A. Yes, sir.

MR. WELSH: I would like to ask the reporter to mark this as Exhibit 29.